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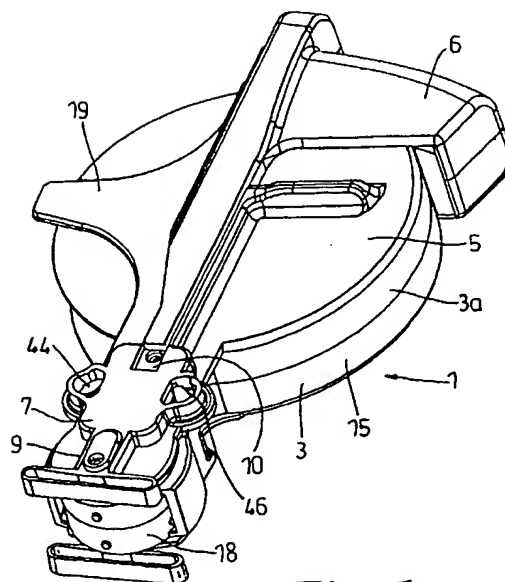
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(54) Abstract Title: **Apparatus for dispensing adhesive dots**

(57) Apparatus 1 for dispensing adhesive elements, provided at spaced apart locations along a tape, to a target location on a surface. The apparatus comprises means for accommodating said tape in a coiled configuration 3, a rotatably mounted tape dispensing head 18 for dispensing adhesive elements from the tape to said surface; and actuating means (2 figure 7) mounted for movement relative to said head and operable to rotate said dispensing head 18 to present an adhesive to said target location. Also provided is a reel (58 figure 10) for holding a length of tape in a coiled configuration. The reel has, on an external surface thereof, an outwardly extending projection (62 figure 10) for registration in a corresponding recess (27 figure 7) in tape dispensing apparatus. The invention also provides a tape-mounted adhesive comprising a carrier tape (60 figure 13) carrying a plurality of removable adhesive elements (70 figure 13) along its length. The carrier tape includes indexing means (64) whereby the carrier tape may be indexed relative to a dispensing means when the carrier tape is mounted in or on the dispensing means.

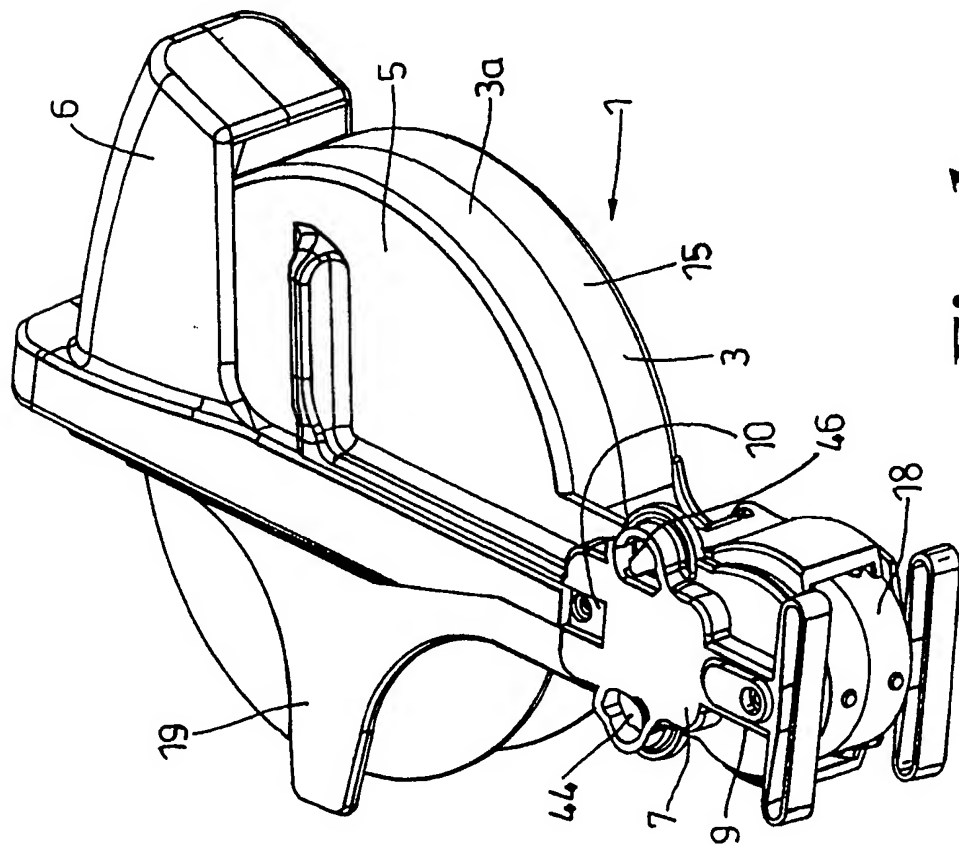


**Fig. 1**

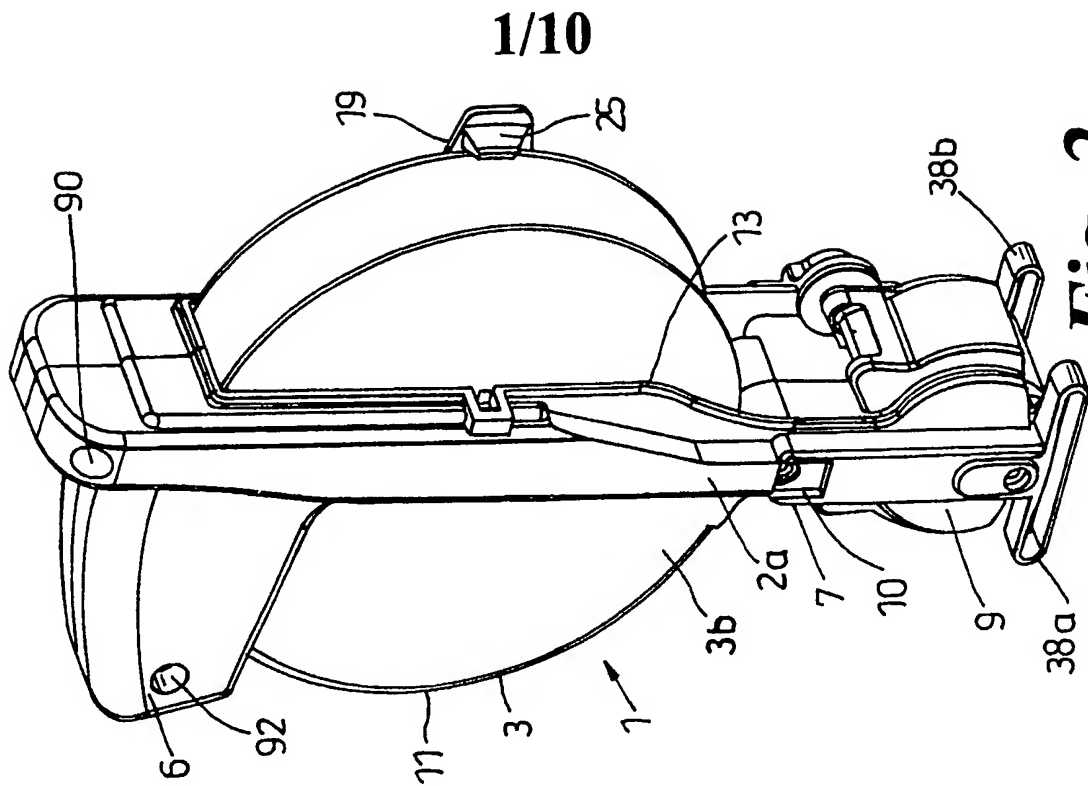
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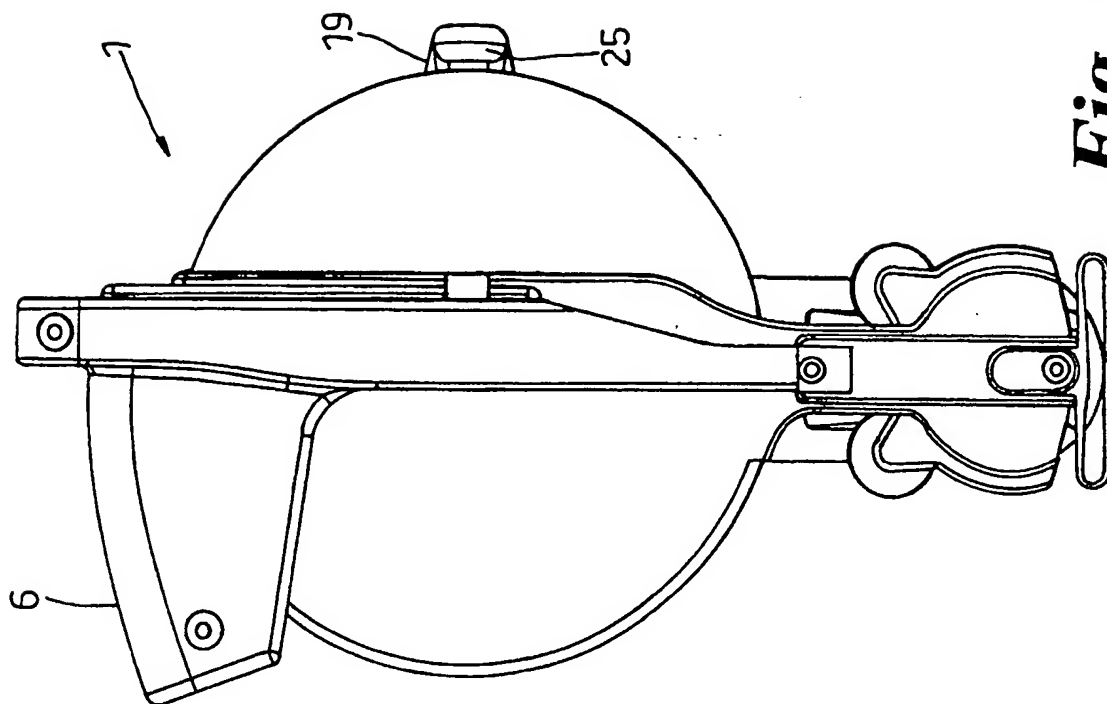
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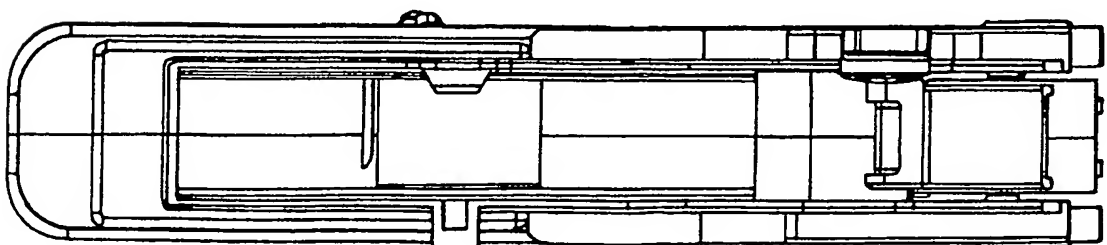
**Fig. 1**



**Fig. 2**



*Fig. 4*

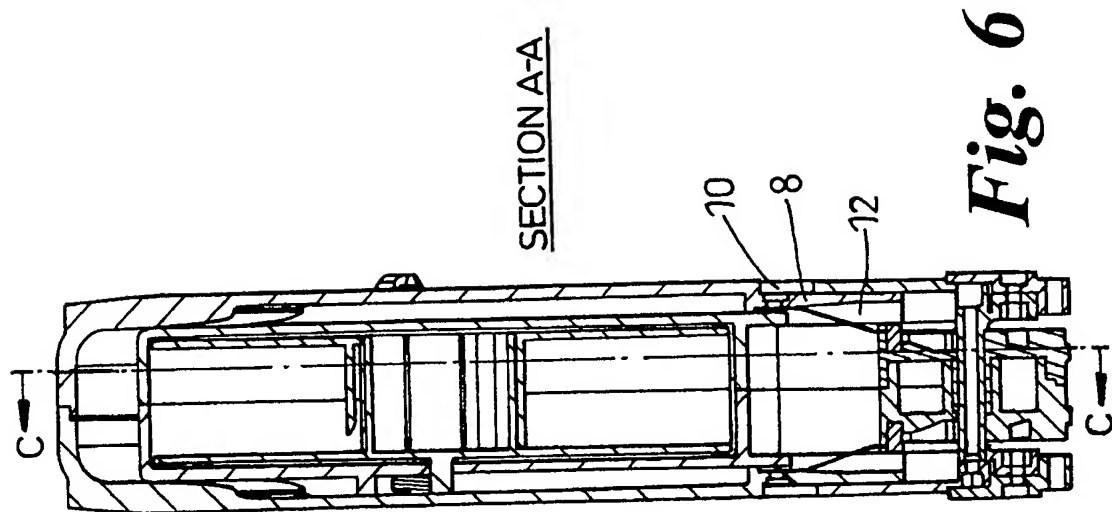
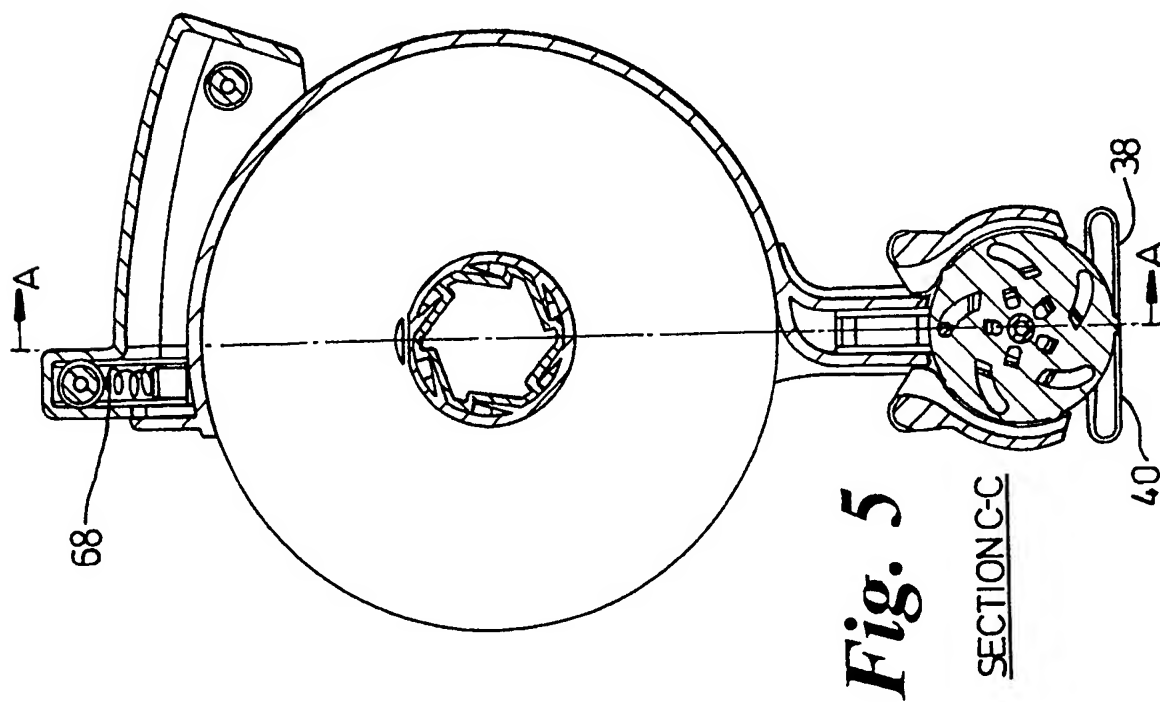


*Fig. 3*

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3/10



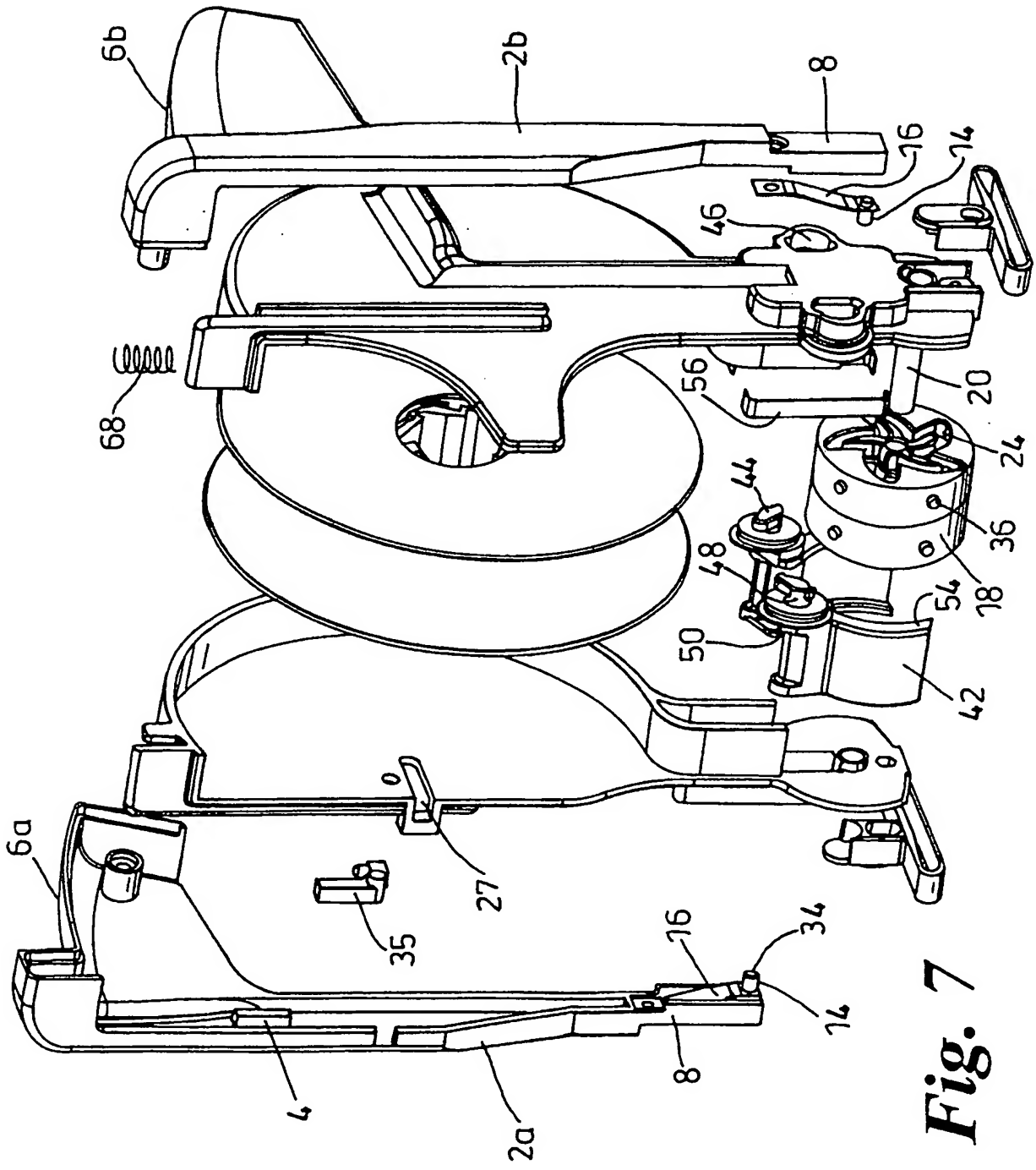
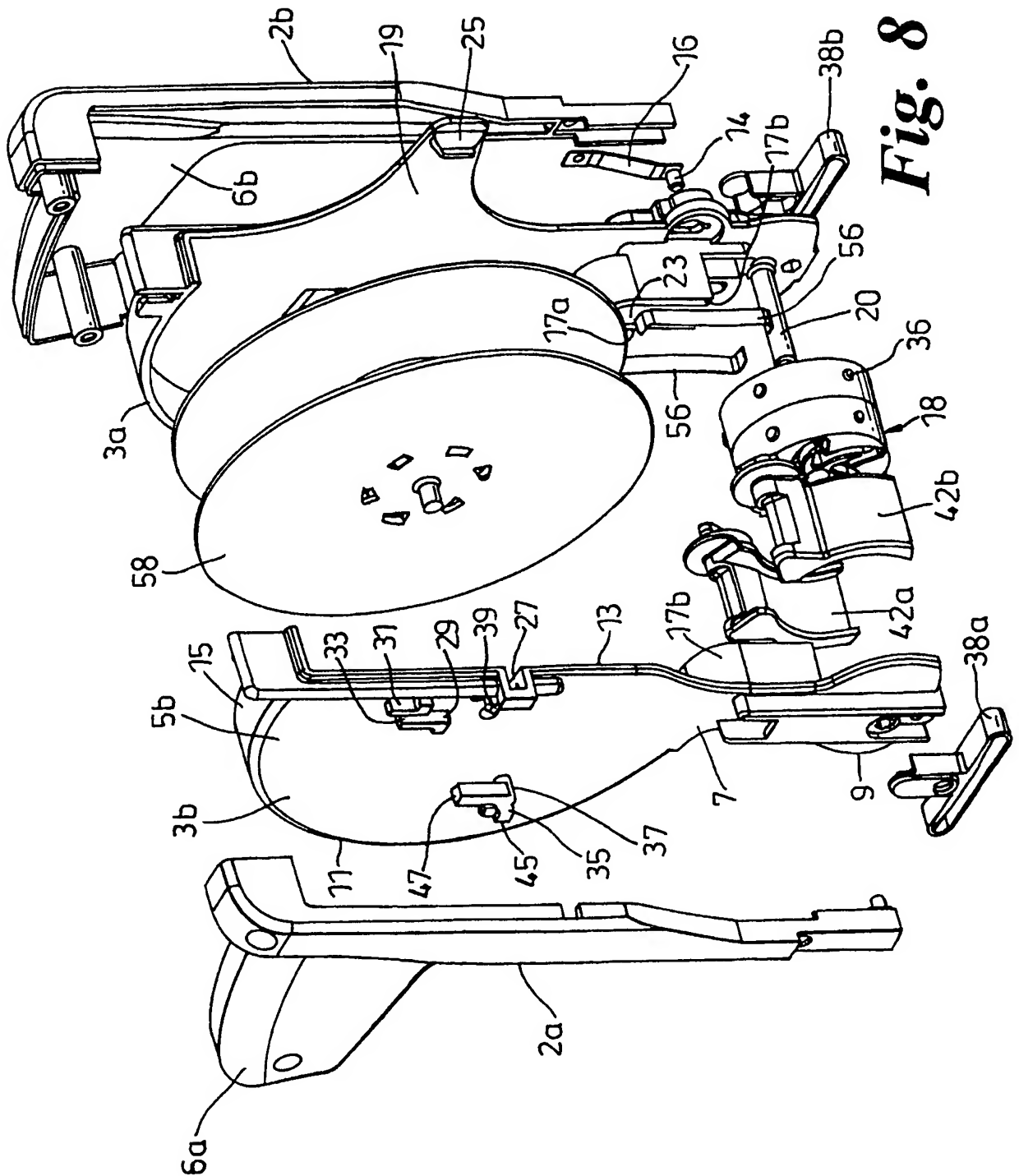
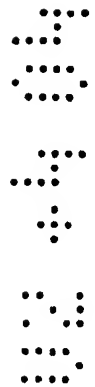
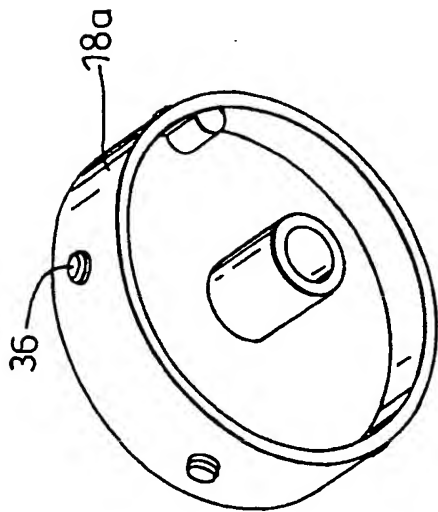


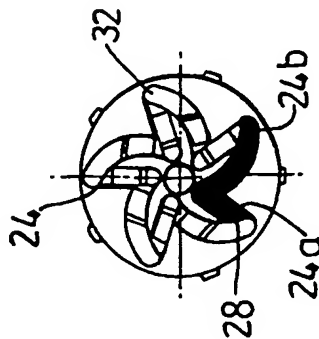
Fig. 7



**Fig. 8**



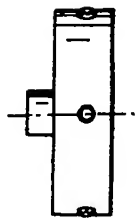
**Fig. 9B**



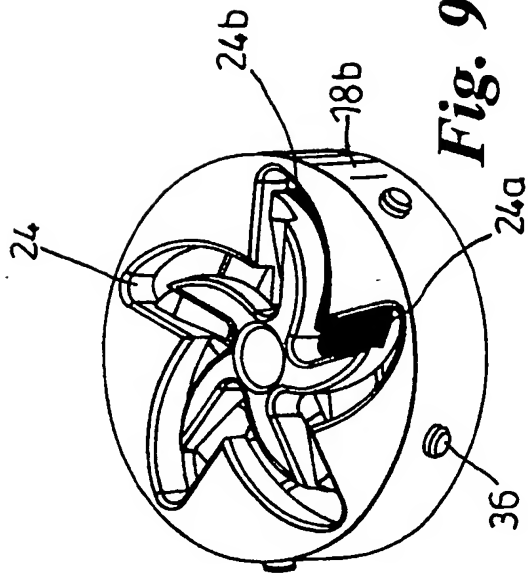
**Fig. 9A**



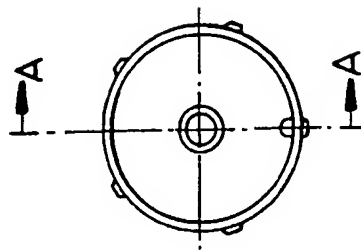
**Fig. 9C**



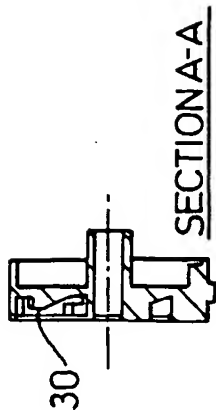
**Fig. 9E**



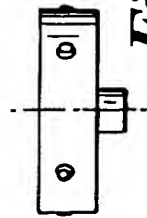
**Fig. 9H**



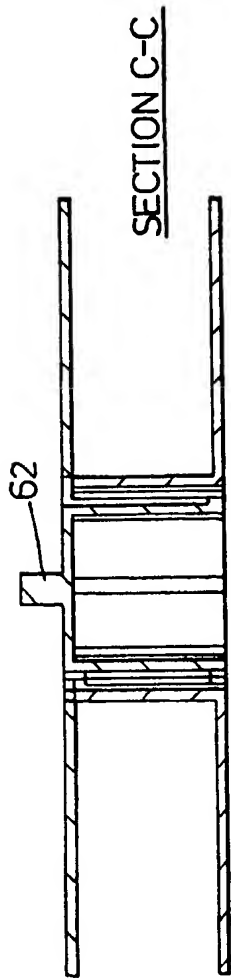
**Fig. 9F**



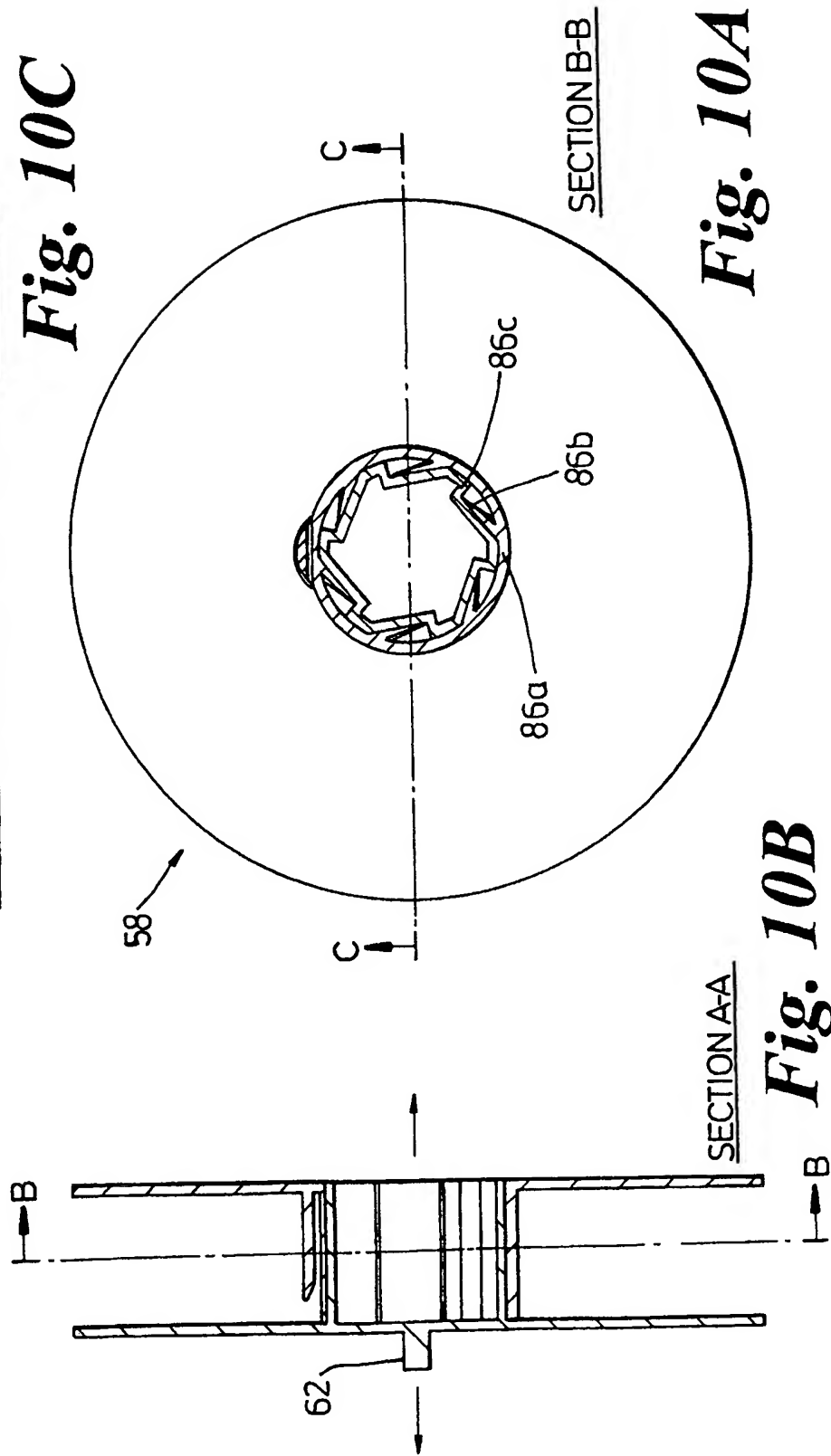
**Fig. 9D**



**Fig. 9G**



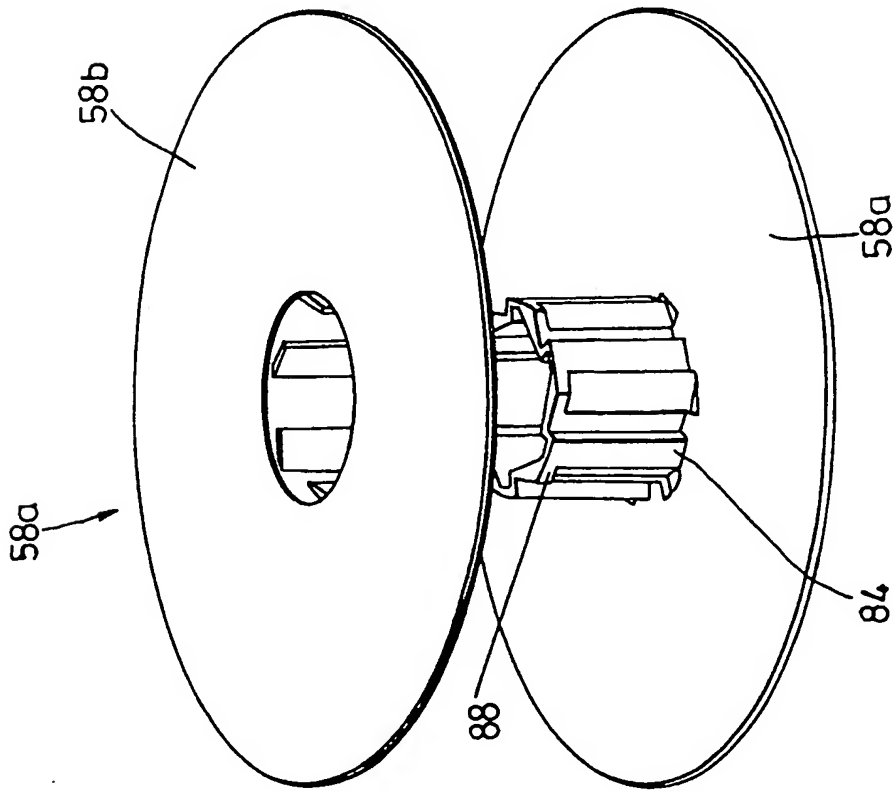
**Fig. 10C**



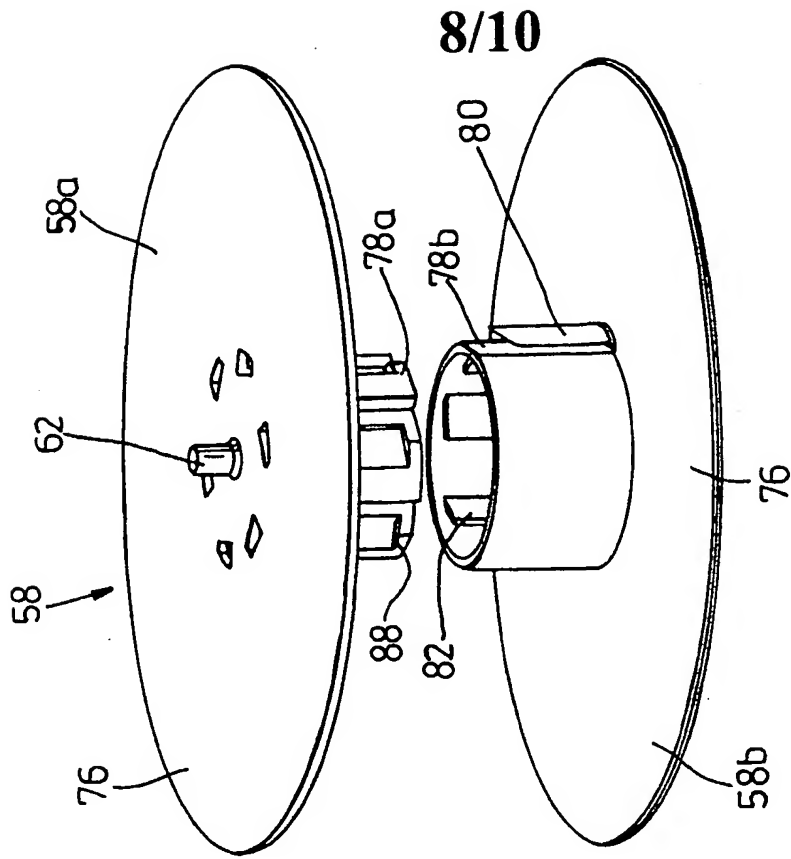
**Fig. 10A**

**Fig. 10B**





**Fig. 11A**



**Fig. 11B**

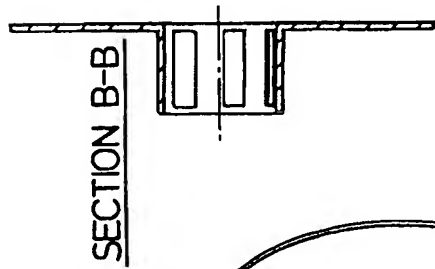


Fig. 12A

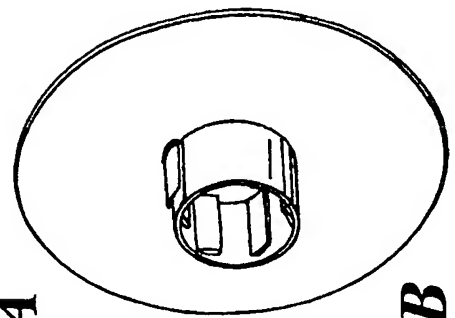


Fig. 12B

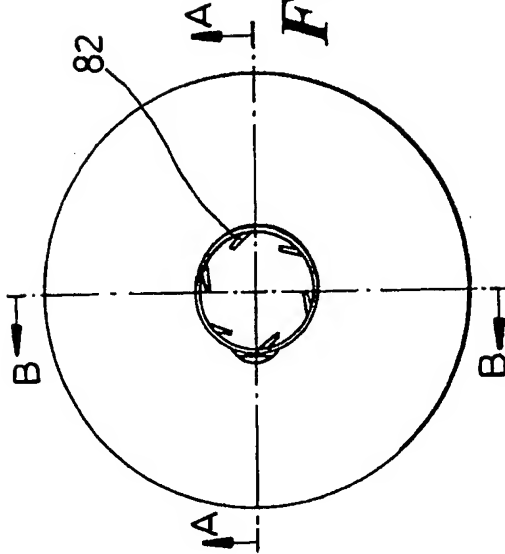


Fig. 12C

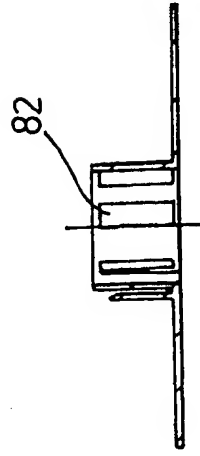


Fig. 12D

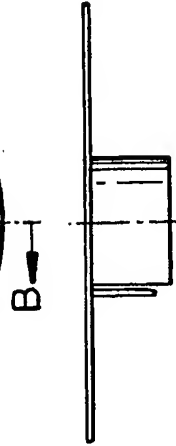


Fig. 12E

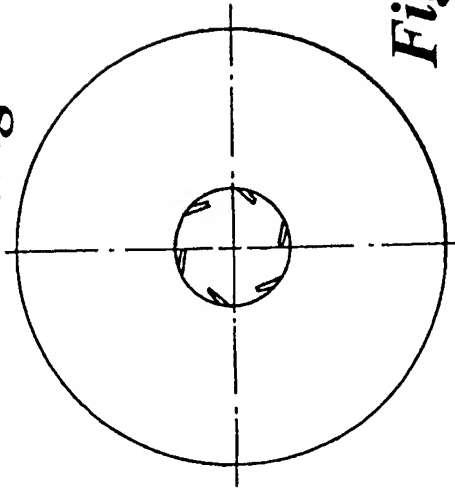
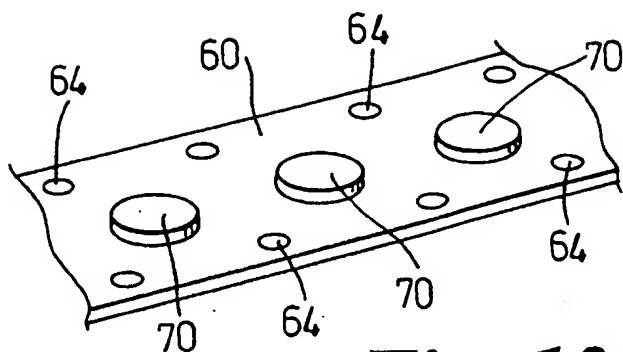


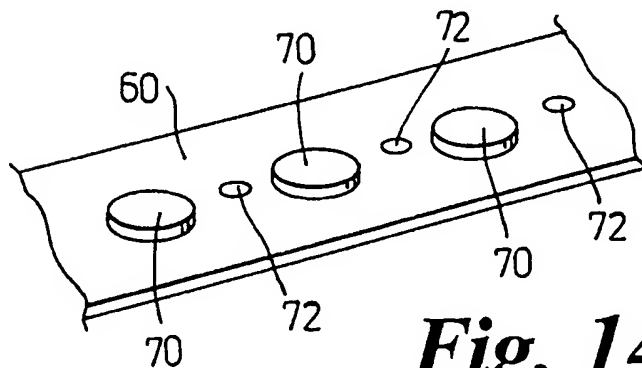
Fig. 12F

Fig. 12G

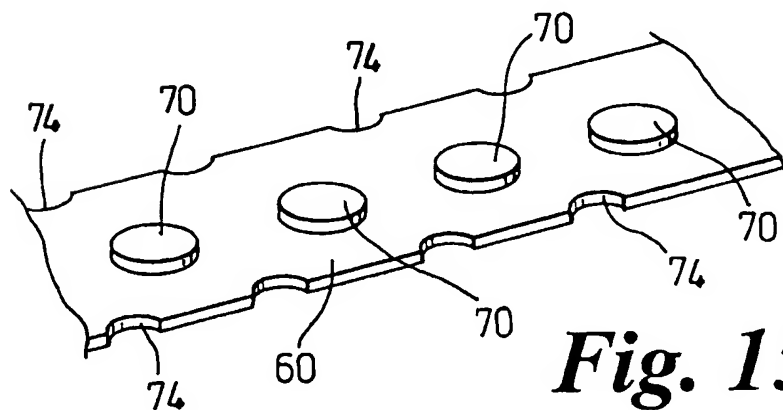
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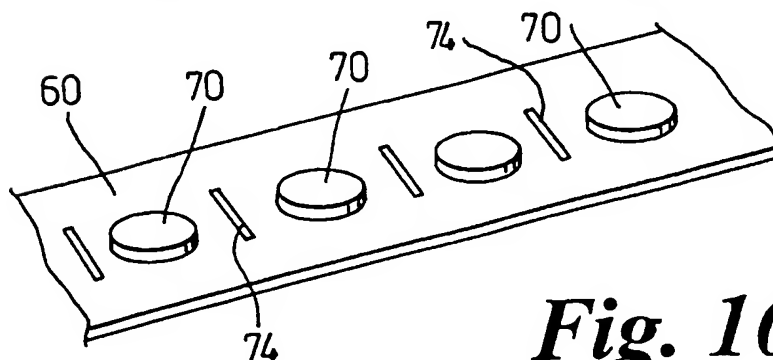
**Fig. 13**



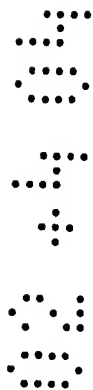
**Fig. 14**



**Fig. 15**



**Fig. 16**



## **APPARATUS FOR DISPENSING ADHESIVE**

### **Field of the Invention**

5 The present invention concerns a method and apparatus which is used to dispense adhesive in the form of adhesive elements such as glue dots or the like. In particular, but not exclusively, the apparatus and method is used to dispense adhesive elements which are carried on a tape or the like. The present invention is also concerned with the tape-mounted adhesive elements of the type used in such apparatus and reels for holding such tape.

10

### **Background of the Invention**

Adhesive dots, pads or the like (referred to hereinafter as adhesive dots or glue dots) mounted on a silicone release tape, wherein the adhesive dots are equi-spaced along the length of the tape, are well known, see for example those sold under the name 15 SUPERDOTS (RTM). Such dots are used to removably secure a first item to a second item, an example being an insert of a fragrance sample in a magazine.

One known form of means for removing an adhesive dot from the carrier tape and securing it to an item involves the use of a stand or housing in which the carrier tape 20 – carrying the adhesive dots– is mounted in roll form, the carrier tape being fed from the stand or housing such that the sequentially arranged adhesive dots may be removed manually by a user – usually one at a time – from the carrier tape. Such stands or housing are often made from cardboard.

25 Whilst the above-described stand or housing has proved very successful, its use is very time-consuming, since it involves pulling through by hand of the carrier strip in order to correctly position the adhesive dot to be removed for transference to the item to which it is to be attached.

There exists a need for an apparatus which may be used to dispense adhesive elements such as adhesive dots quickly and more efficiently. Reels to hold tape carrying such adhesive elements are also required.

- 5 It is an aim of embodiments of the present invention to at least partly mitigate the above-mentioned problems.

The present invention aims to provide an improved form of tape dispensing apparatus which will enable a single or a plurality of adhesive element(s) to be accurately  
10 presented to a specific location relative to the apparatus and from which said adhesive elements will be removed.

The present invention also aims to provide an improved form of the tape-mounted adhesive means which is capable of being indexed so as automatically and correctly  
15 to position an adhesive dot, pad or the like for removal from the carrier tape and its transference to an item to which the adhesive dot is to be secured. The present invention further provides a reel for holding the tape in coiled configuration.

#### Statements of Invention

- 20 According to a first aspect of the present invention, there is provided apparatus for dispensing adhesive elements, provided at spaced apart locations along a tape, to a target location on a surface, the apparatus comprising:

means for accommodating said tape in a coiled configuration;  
a rotatably mounted tape dispensing head for dispensing adhesive  
25 elements from the tape to said surface; and  
actuating means mounted for movement relative to said head and  
operable to rotate said dispensing head to present an adhesive to said target  
location.

- 30 Preferably, the actuating means is mounted for linear movement relative to the dispensing head. Advantageously, the dispensing head comprises a drum, the drum

having a camming groove on at least one end surface. Preferably, the actuating means includes a cam follower which locates in the groove. More preferably, the drum comprises a groove on both end surfaces.

- 5 Preferably, each groove comprises a plurality of zones, each zone including two upwardly inclining tracks ending in a stepped portion. Preferably, the dispensing head further comprises registration means for registration with the tape. Advantageously, the registration means comprises a plurality of raised projections on a circumferential surface of the dispensing head.

10

Preferably, the actuating means is biased to a non-actuating position during use. Advantageously, the tape accommodation means comprises two sections which define a space therebetween, said space being adapted to accommodate a tape in coiled configuration during use. Advantageously, one of the sections includes a

- 15 recess, the recess being for accommodating a peg situated on a tape reel.

Preferably, the apparatus further comprises guide means for holding the tape on the dispensing head during use.

- 20 According to a second aspect of the invention, there is provided a reel for holding a length of tape in a coiled configuration, said reel having, on an external surface thereof, an outwardly extending projection for registration in a corresponding recess in tape dispensing apparatus.

- 25 Preferably, the reel comprises two sections, each section including a backing portion and an inner tubular portion. More preferably, the inner tubular portions are interconnectable with each other.

- Preferably, the backing portions are circular and the projection is a peg protruding
- 30 from the centre of one of the backing sections. Preferably, the reel includes a clip for

securing a free end of tape. The clip enables the tape to be fixed in place before being coiled, thus reducing the likelihood of the tape slipping as coiling begins.

5 Preferably, a first inner tube portion of the reel comprises a plurality of flanges on its inner circumferential surface and a second inner tube portion comprises an external circumferential surface that corresponds to the flanges.

10 Preferably, twisting of the inner tube portions of the reel relative to each other once they are interconnected, causes the flanges to lock with the surface of the second inner tube portion thereby locking the inner tubes together. More preferably, the second inner tube portion further comprises means to prevent the inner tube portions from being pulled apart once locked together.

15 According to a third aspect of the invention, there is provided a tape-mounted adhesive comprising a carrier tape carrying a plurality of removable adhesive elements along its length, the carrier tape including indexing means whereby the carrier tape may be indexed relative to a dispensing means when the carrier tape is mounted in or on the dispensing means. The adhesive may be stored for use on reels of the present invention.

20

Preferably, the indexing means comprises:

- a) register holes or apertures along one or each side of the carrier tape, said holes or apertures being equi-spaced along said one or each side;
- b) a single line of register holes or apertures located along the centre line of said carrier tape and between the adhesive elements;
- 25 c) cut-outs or indentations in the edge(s) of the carrier tape, said cut-outs or indentations being equi-spaced along said edge(s); or
- d) equi-spaced raised members located along one or more sides of said carrier tape or equi-spaced along the centre line of said tape and between
- 30 the adhesive elements.

The provision of the indexing means such as register holes provide an accurate indexing means for moving the carrier tape and ensuring that an adhesive dot, pad or the like to be removed from the carrier tape is located in the correct position for such removal.

5

Preferably, the carrier tape comprises a silicone release paper. Preferably, the adhesive elements comprise hot-melted thermoplastic adhesive or a water-based emulsion adhesive.

- 10 It will be appreciated that other means for indexing the carrier tape may be provided on said tape, and it is intended that all such other means be included in the ambit of the present invention.

According to a fourth aspect of the invention, there is provided a method of dispensing adhesive elements from a tape to a target location on a surface comprising:

- 15 a) placing a reel for holding a length of tape in a coiled configuration, said reel having, on an external surface thereof, an outwardly extending projection for registration in a corresponding recess in tape dispensing apparatus, the reel carrying a tape-mounted adhesive comprising a carrier tape carrying a plurality of removable adhesive elements along its length, the carrier tape including indexing means whereby the carrier tape may be indexed relative to a dispensing means when the carrier tape is mounted in or on the dispensing means into apparatus for dispensing adhesive elements, provided at spaced apart locations along a tape, to a target location on a surface, the apparatus comprising means for accommodating said tape in a coiled configuration, a rotatably mounted tape dispensing head for dispensing adhesive elements from the tape to said surface; and actuating means mounted for movement relative to said head and operable to rotate said dispensing head to present an adhesive to said target location;

- 25 b) feeding a free end of the tape on to the tape dispensing head; and
- 30



c) operating the actuating means to rotate the dispensing head and present an adhesive element to the target location.

The present invention provides apparatus which is used to dispense adhesive elements such as glue-dots. In particular, the apparatus is used to dispense adhesive elements which are carried on a tape or the like. The present invention also provides an improved form of tape-mounted adhesive means which is capable of being indexed so as automatically and correctly to position an adhesive dot, pad or the like for removal from the carrier tape and its transference to an item to which the adhesive dot is to be secured. The present invention further provides a reel for holding the tape in coiled configuration.

#### **Detailed Description of the Invention**

In order that the invention may be more readily understood, embodiments thereof will now be described hereinafter, by way of example only, with reference being made to the accompanying drawings, in which:

Figure 1 is a perspective view on one side and the underside dispensing apparatus of the present invention;

Figure 2 is a perspective view on the other side and the top of the dispensing apparatus of Figure 1;

Figure 3 is a schematic end view of Figure 1;

Figure 4 is an elevation on one side of the of the apparatus of Figure 1;

Figure 5 is a section through the apparatus of Figure 1, taken on line C-C of

Figure 6;

Figure 6 is a section through the apparatus of Figure 1, taken on line A-A of Figure 5;

Figure 7 is an exploded perspective view on one side of the apparatus of Figure 1;

Figure 8 is an exploded perspective view on the side of the apparatus of Figure 1;

Figure 9A-H are various views of the tape feeding means of the apparatus of Figure 1;

Figure 10A-10C are views of the tape reel of the apparatus of Figure 1;

Figure 11A and 11B are perspective views of the tape reel showing the separated components of the apparatus of Figure 1;

Figure 12 is a perspective view of a first embodiment of a carrier tape of the invention;

Figure 14 is a perspective view of the invention;

Figure 15 is a perspective view of a third embodiment of a carrier tape of the invention; and

Figure 16 is a perspective view of a further embodiment of the invention.

In the drawings like reference numerals refer to like parts.

Referring to Figures 1 to 8 of the accompanying drawings, dispensing apparatus 1 includes a broadly shallow, part-cylindrical housing 3. Housing 3 comprises two secured together sections 3a and 3b.

Throughout the description and the claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising" will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Each section 3a, 3b comprises an upper portion 5a, 5b, a neck portion 7a, 7b and a lower portion 9a, 9b. The housing 3 is adapted to hold a coiled tape carrying adhesive elements such as glue dots or the like, or alternatively a reel holding a tape, carrying adhesive elements in coiled configuration. The upper portions 5, 5b of the sections are generally half-circular in shape and have a curved edge 11 and a straight edge 13. Both upper portions have a raised wall 15 around their curved circumference. The raised wall starts at the top of the upper portion and runs along the upper portions' curved circumferential edge. Each wall 17 splits into two 17a, 17b at the base of the

upper portion 9, which continue into the centre of the neck portion 7 where they together define a channel 23 in the neck portion 7 of each section. The distal edge of the raised wall of section 3a interlocks with the distal edge of section 3b to form the housing and together define a space 21 in which the reel or tape may fit and held  
5 during use. Similarly, the edges of the channel of each section fit together.

The housing 3 further includes a rearward arm 19 which together with finger 25, holds the reel or coiled tape in place once the reel has been positioned in the housing. At about the centre of housing 3, edge 13 is shaped to provide an entrance for a blind  
10 recess 27 which extends radially some distance from the centre towards curved edge 11. This recess 27 is sized to accommodate a peg situated on one side of a reel holding tape carrying adhesive means, as described in more detail later. Situated above the entrance of recess 27 are two L-shaped projections 29 and 31 which are in a staggered relationship and together define a channel 33 therebetween.

15 Situated between the recess and the L-shaped projections is a stop member 34 comprising a bent arm 35 having a rounded portion 37 which is pivotally attached to the section 3a. The rounded portion 37 is supported by curved member 39. The bent arm is urged about its pivot 41 by a helical spring 43.

20 The helical spring 43 is located between and contacts both a first distal end 45 of the bent arm and the base of one of the L-shaped projections 29. A second distal end 47 of the bent arm is situated in the channel 33 defined by the L-shaped projections, when the bent arm is being urged by the helical spring 43. In addition, when the bent  
25 arm is held under the urging force of the helical spring, the first distal end 45 of the bent arm is positioned so that it overlaps the recess 27 when viewed from above.

In an alternative embodiment, which may be used to dispense adhesive elements which are carried on a reel that does not comprise a peg, section 3b does not  
30 necessarily comprise the recess, channel or stop member. In this embodiment, section 3b may have a smooth exterior surface.

The apparatus further comprises an actuating means. The actuating means in the illustrated embodiment comprises a pair of arms 2a and 2b situated on opposing exterior sides of the housing. The arms 2a and 2b are connected together at the top of the housing by a screw (not shown) extending into hole 90. The actuating means is  
5 biased to a non-actuating or first position by a spring 68.

As best seen in Figure 7, the arm 2a is broadly a mirror image of arm 2b, but has some additional features not present on arm 2b. Arm 2a also includes a block 4  
10 protruding from its interior surface approximately one third down the length of the arm. Block 4 is a solid rectangular oblong block of a size to enable it to fit into, and move up and down the channel 33 of section 3a, once the second distal end of the bent arm has been moved out of position by a peg situated on one side of the reel holding the tape carrying the adhesive means.

15 The actuating means includes a handle 6 which may be gripped by the user during dispensing of the adhesive means. The handle is in two parts, a first part 6a integral with the arm 2a and a second part 6b integral with arm 2b. The first part and the second part are fastened together by a threaded screw (not shown) extending into  
20 hole 92.

The lower portion 8 of each arm 2 is offset from the rest of the arm which enables the lower portion to pass through a slot 10 in the neck portion of each section 3a, 3b of the housing and thus be accommodated in a channel 12 on the inside of each section  
25 of the housing 3 as shown in Figure 6. Each lower portion 8 is provided with a metal leaf spring 16 which is fixed at its upper end to portion 8 and at its lower free end it carries a metal pin 34.

The apparatus 1 includes a tape dispensing head in the form of a drum 18. Drum 18  
30 is a truncated cylinder which is mounted for rotation on spindle 20 extending between the bottom ends of arms 2 of housing 3. Drum 18 is mounted for rotation

about its longitudinal axis on a pin or spindle 20, Drum 18 is formed from two sections, as shown in Figure 9.

5 The pin or spindle 20 is secured to the arms 2 of the housing 3 via fastening means such as a threaded screw which runs from the lower portion 9a of first section 3a to the lower portion 9b the second section 3b along a bore situated in the centre of the pin or spindle. Drum 18 is formed of a synthetic plastics material.

10 Referring to Figure 9 of the accompanying drawings, drum 18 is provided with an endless recessed groove track 24 in each of its flat side surfaces. Groove 24 is a star- or spider-shaped formation and comprises five lobes or zones 28. Each zone 28 comprises two discrete tracks. A single zone is highlighted in black in Figure 9A and includes two tracks shown as 24a and 24b. Each track in the illustrated embodiment is slightly curved along its length and is also upwardly inclining from its first end to  
15 its second end (travelling from the first end to the second end of each track in this instance being in a clockwise direction, as shown in Figure 9D). The upwardly inclining nature of each track ensures that the second end of one track is raised relative to the first end of the adjacent track and a stepped portion 30 is provided at an intersection between adjacent tracks, both between adjacent tracks in a particular  
20 zone and between adjacent tracks of adjacent zones. The stepped portions are situated slightly forward of each apex of the groove and are to prevent the pins reversing their movement, and hence preventing reverse movement of the drum 18 during rotation of the drum 18 as will be later explained.

25 The distal portion 34 of each pin 14 is engageable in the groove 24 of the drum 18 and rides along the tracks during use, driving rotation of the drum upon depression or displacement of the actuating arms. The leaf spring 16 ensures a firm connection between the distal portion of the pin and the tracks of the drum.

30 As shown in Figures 8 and 9, the drum further comprises a plurality of registration means for registration with indexing means provided on the tape carrying the

adhesive elements. The registration means are provided on the outer curved surface of the drum and take the form of twelve projections 36 arranged in pairs which are spaced equally around the outer circumferential surface of the drum. The provision of the projections 36 on the drum 18, which register with sprocket holes 64 in the tape  
5 60, ensure that the dots 70 of adhesive are always positioned at the correct location to be transferred from the tape to an article to which a dot of adhesive is to be applied.

As shown in Figure 7, apparatus 1 includes feet 38a, 38b. Foot 38a is attached to the lower portion of section 3a of the apparatus by fastening means such as threaded  
10 screws or the like. Similarly, foot 38b is attached to the lower portion of section 3b.

Feet 38a, 38b have a flat ground-contacting surface 40, thus enabling the apparatus to be stored in an upright position. During use, the feet contact the surface upon which adhesive elements are to be placed and hold the surface taut. This facilitates the  
15 dispensing of the adhesive elements onto the surface.

A pair of guides 42a, 42b in the form of pivoted flaps are pivotably mounted to respective neck portion 7b of housing 3. These guides 42a, 42b ensure that the tape is retained around the circumferential surface of the drum 18. This is achieved by  
20 preventing the tape from moving more than a predetermined distance away from the outer surface of the drum. As shown in Figure 8, the guides 42a, 42b are situated on opposing sides of the drum 18. Both guides 42, 42b comprise a lug 44 which is correspondingly shaped to a cavity 46 present in the neck portion 7b of the housing. The lug 44 is attached to the main portion of the flap via a guide neck 48. The guide  
25 neck 48 enables the lug to be inserted into the cavity 46, pushed through the cavity and then twisted to ensure each guide ear is securely mounted to the neck portion 7b of the housing in a "lock and key" relationship. In this way the shape of it can be located through the cavity and then turned. The shape of the lug is such that once turned parts of the lug are prevented from passing back through the cavity.

30

The guide neck 48 is attached to a distal portion 50 of the guide. The body of each guide 42a, 42b is curved to correspond to the curvature of the outer circumferential surface of the drum 18. These curved portions are each provided with inwardly extending flanges 54 along their length.

5

The lug 44 further carries out an additional function of retaining the guides in a desired position. One end 44a of the lug pushes against a resilient portion 56 of the housing. The resilient portion 56 comprises a metal strip which is secured at both its ends to the interior of the housing.

10

The contact between the lug 44 and the resilient portion 56 of the housing is resiliently resistive, such that force is required to overcome the resistance between the two in order to move the guides into a desired position. The resistive force between the lug and the resilient portion means that the guides will not move from this position unless acted upon again by a force. This enables the guides to be moved upwardly and retained in a raised position, to allow the tape to be positioned around the drum 18, as described in more detail below. The guides may then be pushed downwards by the user back into position i.e. around the drum. This movement will be against the resistive force of the contact between the lug and the resilient portion of the housing.

20

In use, a reel 60 holding a tape in coiled configuration is inserted into the space between sections 3a and 3b. The reel has a peg 62 on one of its sides. As the reel is inserted into the housing, the peg fits into the recess 27 of section 3b. The peg contacts the first distal portion of the bent arm and urges it around its pivot 39, against the urging force of the helical spring. The peg, by moving the bent arm around its pivot, causes the second distal end of the bent arm to move out of the channel 33. The finger 25 of rearward arm 19 holds the reel in place in the housing.

25

The free end of the tape is pulled to release a length of tape from the reel. The first and second guides 42a, 42b are positioned in away from the drum. The free end of

the tape is then fed between the first guide 42a and the neck portions 7 of sections 3a and 3b. The sprocket holes of the tape are then lined up with the sprockets of the drum 18, so that the tape is always in registration with the drum. The free end of the tape is then fed between the second guide 42b and the neck portions of sections 3a and 3b. Both guides are then positioned around the drum. When the guides are in this position, the distal end 50 of each guide holds the tape taut against the neck portions of sections 3a and 3b. The apparatus is then ready for use to dispense the adhesive means.

To dispense adhesive elements from the tape held in the apparatus, pressure is applied to the actuating means, which has the effect of moving the actuating means linearly into a second or actuating position. Using the illustrated embodiment of the present invention, a user or mechanical apparatus presses downwardly on the top portion of the actuating means or arm. The application of downward pressure to the arms results in depression or linear downward movement of the arms against the spring 68. The downward pressure on and subsequent linear movement of the arms has the effect of applying a rotational movement to the drum 18.

Each arm moves in a downward direction by the same distance. This movement enables the block 4 of arm 2a to move down the channel 33. The block 4 is permitted to move through the channel 33 due to the bent arm 35 being moved out of its resting position in the channel by insertion of a peg on one side of a reel of tape. The motion of the arm moving downwards causes the distal end 34 of the pin 14, which is engaged with the surface of the groove 24 of the drum, to start moving along one of the tracks of the drum. The start point of the pin in each actuation is the outer apex or point of a zone 28. The pin is forced, due to the force exerted on the actuating means, to travel along the upwardly-inclining track e.g. 24b and then over the stepped portion 30 at the inner apex of the zone.

Release of the pressure on the top of the actuating means results in the actuating means returning to its non-actuating or first position, due to the force of the spring



68. As a result, the arm moves in an upward direction towards its initial position. This causes the distal end 34 of the pin, which is attached to the arm 2, to move upwards within the groove. Thus, the pin moves from the inner apex, along track 24a and over the stepped portion at the outer apex. Thus, a single actuation of the  
5 actuating means results in the pin moving through one zone of the drum groove. The movement of the pin down two tracks of a zone causes the drum to rotate reciprocally about its axis by a single step. The stepped portions prevent the pin from returning to the track it has previously followed and thus prevent the reversal of rotation of the drum.

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As the drum rotates, the tape 60 registered thereon also moves. Each actuation, and subsequent partial rotation of the drum, results in the tape being fed around the drum. This movement enables an adhesive element such as a glue dot or pad carried on the  
15 the adhesive means to be "peeled off" the tape and, if the adhesive means is in contact with a surface or article, thus onto a surface. This peeling off action results in a more effective transfer of adhesive means to a surface than if the adhesive means was simply pressed onto a surface. Additional depressions of the arms 2a, 2b result in additional partial rotations of the drum 18, thus feeding the tape across the lower or  
20 dispensing surface of the drum. The adhesive element are carried on the tape in a relationship which corresponds with the indexing means, so that a single adhesive element will be exposed on the lower surface of the drum on each actuation.

The tape from which adhesive element has already been dispensed is then fed  
25 through between the second guide and the housing, and may be torn off by the user if desired.

The drum therefore rotates clockwise, driven by the movement of the pin along the groove, whilst the pin returns to the same position after every actuation. The  
30 configuration of the labyrinthine groove means that the rotational movement of the drum occurs when the pin moves down the first track of each zone. The drum 18

does not rotate when the pin moves along the second track of the zone. Repetition of the above-described procedure transfers successive dots 26 of adhesive to the same or other surfaces (not shown) which are placed in the correct positions relative to the drum 18.

5

Embodiments of tape carrying adhesive for use with apparatus such as that described above are shown in Figures 13 to 17. Referring first to Figure 13, there is shown a carrier tape 60 formed of a silicone release paper and carrying a plurality of removable adhesive dots or pads 70. Dots 70 are equi-spaced along the centre-line of

10 said carrier tape.

Along each side of the carrier tape 60, and equi-spaced along said sides, is a plurality of register holes or apertures 64, said register holes or apertures 64 being located on transverse centre-lines between adhesive dots, pads or the like 70.

15

Figure 14 shows a carrier tape 60, again carrying a plurality of adhesive dots or pads 70, but in this embodiment a plurality of register holes or apertures 72 are located on the centre-line of the carrier tape and between the adhesive dots, pads or the like.

20 In Figure 15, the carrier tape 60, having a plurality of adhesive dots or pads 70, is provided with a plurality of cut-outs or apertures 74 in the edges of said carrier tape 20, the cut-outs or apertures being equi-spaced both with respect to each other and to the adhesive dots 70.

25 Thus, in the case of each of the tapes shown in Figures 13 to 16, the adhesive dots are evenly spaced along the length of the tape. The tape is provided with pairs of register holes or apertures which are equi-spaced relative to the dots of adhesive and which are engageable by the sprockets on the drum 7 during passage of the tape through the apparatus of the present invention.

30

. . . . .

The adhesive may be a hot melt thermoplastic adhesive or a water-based emulsion adhesive, or indeed any other suitable form of adhesive, and the tape will be a silicon release tape of the type that will facilitate the readily removal of the dots therefrom. Instead of the adhesive being in the form of dots, it may take the form of pads or other suitable shapes, and each individual dot, pad or other shape may be made up of a plurality of smaller areas of adhesive.

It will be appreciated that instead of the described apparatus being hand-held, it may be mechanically or electrically operated so as to give a degree of automation to the dispensing of the adhesive dots, pads, or the like.

Figures 10-12 show a reel 58 for use with apparatus 1 and which holds the tape in coiled configuration. The reel comprises two sections, a first section 58a and a second section 58b. Each section has a substantially flat backing portion 76 and an inner tube-like portion 78. The inner tube-like portion of section 58a is adapted to engage with the inner tube-like portion of the section 58b. The backing portions of each section in the illustrated embodiment are circular. It is envisaged that, in alternative embodiments, the backing portions may be, for example but not limited to, hexagonal, square or octagonal.

First section 58a comprises a lug 62 on a surface opposing the inner tube like portion. The lug is positioned at the centre of the backing portion and is for registration with a recess in a tape dispensing apparatus. Reel 58 is adapted to fit into the apparatus 1, in order to enable adhesive means to be dispensed from the tape held on reel 58. Thus, lug 62 in one embodiment is shaped to fit into the recess of the apparatus.

The first section comprises an inner tube like portion 78a, which is closed at the end adjacent to the backing portion. The second section has an open ended tube portion 78b.

30

Section 58b further comprises a clip 80 to anchor a free end of a tape to be coiled. Second section 58b comprises the clip 80 situated adjacent to the inner tube portion 78b, which enables the tape to be fixed in place before being coiled. The anchoring of a free end of the tape reduces the likelihood of the tape slipping as coiling of the tape around the inner tube begins.

The inner tube portion of the first section fits inside the inner tube portion of the second section to form a double sided reel. The inner tube 78b of the second section comprises a plurality of flanges 82 situated on its interior surface. The inner tube of the first section 58a has an external surface 84 whose shape corresponds to the position of the flanges of the tube portion of the second section to ensure that the two tube-like portions are able to interconnect with each other. In the illustrated embodiment, the external surface 84 of the inner tube 78a is made up of a series of discrete units 86. Each discrete unit comprises three faces: a short first face 86a, a middle face 86b and an end face 86c. The middle face 86b comprises a lip 88 on its end not adjoining the closed end of the tube, as shown in Figure 11B. The end face of one discrete unit is attached to the first face of the adjoining discrete unit.

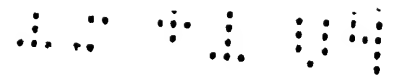
The discrete units of the external surface of the second inner tube-like portion and the flanges of the first inner tube-like portion enable the two sections to be slidably connectable to each other. Before the two sections are connected to form a double-sided reel, a length of tape may be coiled around the tube portion of one of the sections. In the illustrated embodiment, the tape is coiled around the tube portion of the second section, although in alternative embodiments the tape may be coiled around the tube portion of the first section.

To coil a length of tape onto the reel, the tube portion of the second section may be fitted onto a core. A free end of the tape may then be passed through a gap between the clip 80 and the inner tube portion 78b. The tape is then led back on itself to secure its free end. The core may then be rotated to ensure the length of tape is coiled around the reel. The core may be rotated manually or using automated machinery.

The tape is coiled around the tube portion until a desired amount of tape has been loaded onto the reel. In order to prevent the tape falling off the reel, the second section may then be connected to the first section to result in a double-sided reel. It is then possible to make the interconnection between the two sections secure by  
 5 twisting the sections in opposing directions relative to each other. This twisting motion causes each flange 82 to move over the middle and end faces e.g. 86b and 86c of a discrete unit and down the first face 86a of an adjacent discrete unit. The first face has a steep incline which means that the flange cannot then be moved in the opposite direction, if an attempt is made to twist the sections in the opposing  
 10 direction relative to each. The lip 88 prevents the two sections from being pulled apart in the direction shown by arrows on Figure 10B. This results in a two-sided reel with a tube portion therebetween.

It is envisaged that in alternative embodiments, the first section may comprise either  
 15 the first or second inner tube like portions, as long as the second section comprises the corresponding inner tube like portion to ensure that the two sections can be interconnected.

The reel is preferably, though not essentially made from plastic. It is however  
 20 contemplated that the reel may instead be made from other suitable materials, such as cardboard.



## CLAIMS

1. Apparatus for dispensing adhesive elements, provided at spaced apart locations along a tape, to a target location on a surface, the apparatus comprising:  
means for accommodating said tape in a coiled configuration;  
5 a rotatably mounted tape dispensing head for dispensing adhesive elements from the tape to said surface; and  
actuating means mounted for movement relative to said head and operable to rotate said dispensing head to present an adhesive to said target location.  
10
2. Apparatus according to Claim 1, wherein said actuating means is mounted for linear movement relative to said dispensing head.
3. Apparatus according to Claim 1 or Claim 2, wherein the dispensing head  
15 comprises a drum, said drum having a camming groove on at least one end surface, and said actuating means including a cam follower which locates in said groove.
4. Apparatus according to Claim 3, wherein a drum comprises a groove on both end surfaces.  
20
5. Apparatus according to Claim 3 or Claim 4, wherein each groove comprises a plurality of zones, each zone including two upwardly inclining tracks ending in a stepped portion.
- 25 6. Apparatus according to any preceding claim, wherein the dispensing head further comprises registration means for registration with the tape.
7. Apparatus according to Claim 6, wherein the registration means comprises a  
30 plurality of raised projections on a circumferential surface of the dispensing head.

8. Apparatus according to any of the preceding claims, wherein the actuating means is biased to a non-actuating position during use.

9. Apparatus according to any of the preceding claims, wherein the tape accommodation means comprises two sections which define a space therebetween, said space being adapted to accommodate a tape in coiled configuration during use.

10. Apparatus according to Claim 9, wherein one of said sections includes a recess, said recess being for accommodating a peg situated on a tape reel.

10

11. Apparatus according to any of the preceding claims, further comprising guide means for holding the tape on the dispensing head during use.

12. A reel for holding a length of tape in a coiled configuration, said reel having, on an external surface thereof, an outwardly extending projection for registration in a corresponding recess in tape dispensing apparatus.

15

13. A reel according to Claim 12 and comprising two sections, each section including a backing portion and an inner tubular portion.

20

14. A reel according to Claim 13, where the inner tubular portions are interconnectable with each other.

15. A reel according to Claim 12 or Claim 13, wherein the backing portions are circular and the projection is a peg protruding from the centre of one of the backing sections.

25

16. A reel according to any of Claims 12 to 15 and including a clip for securing a free end of tape.

30

17. A reel of any of Claims 13 to 16, wherein a first inner tube portion comprises a plurality of flanges on its inner circumferential surface and a second inner tube portion comprises an external circumferential surface that corresponds to said flanges.

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18. A reel according to Claim 17, wherein twisting of the inner tube portions relative to each other once they are interconnected, causes the flanges to lock with the surface of the second inner tube portion thereby locking the inner tubes together.

10 19. A reel according to Claim 18, wherein the second inner tube portion further comprises means to prevent the inner tube portions from being pulled apart once locked together.

15 20. A tape-mounted adhesive comprising a carrier tape carrying a plurality of removable adhesive elements along its length, said carrier tape including indexing means whereby said carrier tape may be indexed relative to a dispensing means when said carrier tape is mounted in or on said dispensing means.

20 21. An adhesive according to Claim 20, wherein the indexing means comprises:  
a) register holes or apertures along one or each side of the carrier tape, said holes or apertures being equi-spaced along said one or each side;  
b) a single line of register holes or apertures located along the centre line of said carrier tape and between the adhesive elements;  
c) cut-outs or indentations in the edge(s) of the carrier tape, said cut-  
25 outs or indentations being equi-spaced along said edge(s); or  
d) equi-spaced raised members located along one or more sides of said carrier tape or equi-spaced along the centre line of said tape and between the adhesive elements.

30 22. An adhesive according to Claim 20 or Claim 21, wherein the carrier tape comprises a silicone release paper.



23. An adhesive according to any of Claims 20 to 22, wherein the adhesive elements comprise hot-melted thermoplastic adhesive or a water-based emulsion adhesive.

5

24. A method of dispensing adhesive elements from a tape to a target location on a surface comprising:

10 a) placing a reel according to any of Claims 12 to 19 which carries an adhesive according to any of Claims 20 to 23 into apparatus according to any of Claims 1 to 11;

b) feeding a free end of the tape on to the tape dispensing head; and

c) operating the actuating means to rotate the dispensing head and present an adhesive element to the target location.

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Application No: GB0400776.1 Examiner: Mr Rhys J. Williams  
Claims searched: 1-11 and in part claim 24 Date of search: 13 May 2004

## Patents Act 1977: Search Report under Section 17

### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular reference
X	1 and 2 at least	JP 63093374 A (JAPAN ELEC.) See figures 1 and 2 particularly
A	-	JP 05154438 A (NITTO) Note the application of adhesive dots.
A	-	GB 2361442 A (FANTAS-TAK) Note application of adhesive dots.

### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>w</sup> :

B2L

Worldwide search of patent documents classified in the following areas of the IPC<sup>07</sup>

B05C; B65H

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, JAPIO